

Application No.: 09/870180

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Remarks

Claims 22 to 36 are pending. Claims 1 to 21 were previously withdrawn from consideration. No claims have been amended or added.

§ 103 Rejections

Claims 22-30 and 35 stand rejected under 35 USC § 103(a) as being unpatentable over Chau et al (US Patent 5,735,988 in view of Stamm (US Patent 3,712,706) and Rowland (US Patent 3,810,804).

Claims 31, 33, 34 and 36 stand rejected under 35 USC § 103(a) as being unpatentable over Chau et al in view of Stamm.

Claim 32 stands rejected under 35 USC § 103(a) as being unpatentable over Chau et al and Stamm further in view of Rowland.

Discussion

The Examiner's rejections are based upon a faulty interpretation of the references and an inappropriate combination of those references.

With respect to Chau et al, the Examiner has argued that:

1. Chau et al discloses the use of radiation curable adhesives in retroreflective articles. See the Office Action mailed 01/15/2004 at page 7, numbered paragraph 7.

This is not the case. As previously stated by Applicants, Chau et al. only teaches the use of an optically transparent material. Chau et al. is silent with regard to the use of an adhesive.

Additionally, Chau et al. fails to teach retroreflective articles. To the contrary, Chau et al. only teaches a specularly reflective article. As understood by one skilled in the art, the linear structure of Chau et al. would not have the characteristic that obliquely incident incoming light would be reflected in a direction antiparallel to the incident light, or nearly so, so that an observer at or near the source of the light could detect the reflected light.

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2. Chau et al teaches that any type of surface topography may be substituted for the isosceles triangular prisms it teaches and that it therefore requires that one of ordinary skill in the art choose a surface topography having high reflective efficiency. See the Office Action mailed 01/15/2004 at page 7, numbered paragraph 7.

Substitution of a retroreflective surface for the reflective surface of Chau et al. is not appropriate. As already established by Applicants in their previous response, the use of a retroreflective structure would be contrary to the aim of Chau et al. See page 6, third and fourth paragraphs of the response mailed October 3, 2003. Thus the replacement of the continuous peaks of Chau et al. with cube corner cavities, a discontinuous feature, would be contrary to the teachings of Chau et al. In fact, the substitution would not provide high reflective efficiency as proposed by the Examiner. To the contrary, the substitution would reduce the level of reflected light.

Additionally, although Chau et al. says that any type of surface topography can be used to make his reflective article, the reference provides no suggestion as to what type of surface topography is meant. Moreover, this is only a general statement. It teaches that the type of surface topography to be used should be one that maintains the utility of the Chau et al. invention. Since the retroreflective surface of the applicants claims would destroy the utility of the Chau et al. invention, the use of that topography would not be appropriate.

3. One of ordinary skill in the art would have appreciated that when the "adhesive" of Chau et al were applied to its structured surface, some air would be trapped in the cavities and that the cavities would be incompletely filled resulting in a later settling of the adhesive. See the Office Action mailed 01/15/2004 at page 4, last full paragraph.

Carrying out the process of the invention is more than just using less than the required amount of fill material necessary to completely fill the cavities. Applicants have discovered that even though the cavities were not completely filled when the flowable composition was applied to the structured surface, they became filled relatively quickly. This occurred when the gas in the cavities diffused into the fill material causing the voids to shrink and allowed the fill material to flow into the voids. This was not "settling" but rather the result of the combined phenomena of shrinkage of the size of the void when the

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gas diffused into the fill material and the cold flow properties of the fill material. This is the self replication discussed in the specification at page 12, lines 1-25. This capability was a surprising result to the Applicants.

It should also be noted that the problem of incomplete fill is a characteristic problem when cavities are filled. This problem arises because of the structure of the cavities, i.e., constrained on all sides with only the top being open, and the relationship of the fill material to the cavities, i.e., the fill material covers the top of the cavities. As a result, gas cannot escape from the cavities. The linear grooves of Chau et al., however, do not create the same problem. Because they are open at each end, gas can escape from the structure via ends. As a result, the problem of incomplete fill of the cavities does not present itself.

The Examiner argues that it would be obvious to cure/crosslink the curable composition prior to applying the structured surface because this would reduce the time required for curing after its application and thereby improve production efficiency. This is simply incorrect. Partially curing the curable material would not be thought to work. As stated in the previous section, when the cavities are filled, gas is trapped in them. As the gas diffuses into the curable material, the void shrinks and the curable material replaces the shrinking void. When the curable material is cured or crosslinked, it becomes less mobile. That is its ability to flow is reduced. As a result, it is surprising that polymerizing the flowable composition to at least 95% during the second step would work.

The Examiner has seemingly made additional comments with respect to these comments at Page 5, numbered paragraph 5 of the Office Action. However, these comments seem to address only claim 35.

With respect to this claim, Applicants respectfully note that the substitution of cube corner cavities for the parallel peaks and valleys of Chau et al has been addressed above.

With respect to Stamm, the Examiner argues that:

1. Stamm teaches the presence of cube corner cavities.

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Applicants acknowledge that Stamm teaches the presence of cube corner cavities. However, since their use in Chau et al. would be contrary to the teachings of Chau et al. the combination of Chau et al. and Stamm is inappropriate.

2. Stamm teaches that the cube corner cavities are separated on their top surface. As the basis for this assertion, the Examiner cites Figure 1; Col. 2, lines 3-13; Col. 3, lines 35-55; Col. 5, lines 8-14; and Col. 6, lines 38-45 of Stamm.

Applicants challenge this assertion. Stamm does not teach this separation and none of the citations relied upon by the Examiner support his position. The Stamm reference actually teaches away from the use of top surfaces separating the cube corner cavities. Thus Figure 1 shows close packed arrays of cube corner projections. Col.2, lines 3-13 states that the inventor has discovered that the use of a close-packed array of cube corner mirrors provides certain advantages. Col. 3, lines 35-55 states that unexpectedly high retroreflective efficiency is achieved by the use of a retroreflector consisting essentially of a hexagonal close-packed array of contiguous cube corner cavities. Col. 5, lines 8-14 and Col. 6, lines 38-45 compliment the previous discussion. They do not say anything about the presence of top surfaces separating the cavities.

With respect to Rowland, the Examiner argues that:

1. Rowland teaches applying a flowable pressure sensitive adhesive to a structured surface and laminating a releasable sheet to the structured surface.
2. Rowland teaches removing the releasable sheet from the structure and mounting the reflective material to another surface.

Applicant's reiterate the comments they have previously made with respect to Rowland. The further note that Rowland does not overcome any of the shortcomings of Chau et al.

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In view of the above, it is submitted that the application is in condition for allowance.

Reconsideration of the application is requested.

Respectfully submitted,

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